WHAT IS CLAIMED IS:

1. A microchip comprising:

a flow pass for containing a solution having particles therein;

a particle capture unit, including a projection, disposed on a deflection side of said flow pass for capturing at least a portion of said particles; and

a deflection mechanism for deflecting said portion of said particles as said particles flow through said flow pass;

wherein said particle capture unit protrudes into only a portion of a cross section of said flow pass.

2. A microchip according to Claim 1, wherein said projection protrudes from said deflection side of said flow pass in a direction transverse to a direction of flow of said flow pass.

3. A microchip according to Claim 1, wherein said projection protrudes into only a portion of a cross section of said flow pass.

4. A microchip according to Claim 1, wherein said projection has a columnar form.

5. A microchip according to Claim 1, wherein said projection is a plate.

6. A microchip according to Claim 1, wherein said deflection mechanism is adapted to direct said portion of said particles towards said deflection side of said flow pass so as to be captured in said particle capture unit.

7. A microchip according to Claim 1, wherein said deflection mechanism is adapted to direct said portion of said particles away from said deflection side of said flow pass.

8. A microchip according to Claim 1, wherein said deflection mechanism is adapted to generate a field in a direction transverse to a direction of flow of said flow pass.

9. A microchip according to Claim 8, wherein said field is a magnetic field, said portion of said particles being magnetic particles so as to be deflected by said magnetic field.

10. A microchip according to Claim 8, wherein said field is an electric field, said portion of said particles being electrically charged so as to be deflected by said electric field.

11. A microchip according to Claim 10, wherein said deflection mechanism comprises electrodes for generating said electric field.

12. A microchip according to Claim 1, further comprising a micropump for causing said solution to flow through said flow pass.

13. A microchip according to Claim 1, further comprising first and second propulsion electrodes, wherein a voltage applied across said first and second propulsion electrodes causes said particles to flow through said flow pass.

14. A microchip comprising:

a flow pass for containing a solution having particles therein;

first and second branch flow passes, connected to said flow pass; and

a deflection mechanism disposed at a junction between said flow pass and said first and second branch flow passes, for deflecting at least a portion of said particles into one of said first or said second branch flow passes as said particles flow through said flow pass.

15. A microchip according to Claim 14, wherein said deflection mechanism is adapted to generate a field in a direction transverse to a direction of flow of said flow pass.

16. A microchip according to Claim 15, wherein said field is a magnetic field, said portion of said particles being magnetic particles so as to be deflected by said magnetic field.

17. A microchip according to Claim 15, wherein said field is an electric field, said portion of said particles being electrically charged so as to be deflected by said electric field.

18. A microchip according to Claim 14, wherein said deflection mechanism comprises:

a first field generator disposed proximate said first branch flow pass for attracting said portion of said particles to said first branch flow pass; and

a second field generator disposed proximate said second branch flow pass for repelling said portion of said particles from said second branch flow pass, said portion of said particles thus flowing into said first branch flow pass.

19. A microchip according to Claim 18, wherein said first and second field generators comprise electrodes.

20. A microchip according to Claim 14, wherein said deflection mechanism comprises:

a first field generator disposed on a side of said first branch flow pass and distal to said second branch flow pass;

a second field generator disposed proximate said second branch flow pass and distal to said first branch flow pass; and

a third field generator disposed between said first and said second branch flow passes.

21. A microchip according to Claim 14, further comprising a third branch flow pass connected to said flow pass, said deflection mechanism comprising:

a first field generator disposed on a side of said first branch flow pass and distal to said second branch flow pass;

a second field generator disposed between said first and said second branch flow passes;

a third field generator disposed between said second and said third branch flow passes; and

a fourth field generator disposed on a side of said third branch flow pass, distal to said first and second branch flow passes.

22. A microchip according to Claim 14, further comprising a micropump for causing said solution to flow through said flow pass.

23. A microchip according to Claim 14, further comprising first and second propulsion electrodes, wherein a voltage applied across said first and second propulsion electrodes causes said particles to flow through said flow pass.

24. A method for separating particles from a solution containing said particles, the method comprising the steps of:

causing said particles to flow through a flow pass of a microchip;

forming, in a deflection region of said flow pass, a field in a direction transverse to a direction of flow of said flow pass, said field deflecting a portion of said particles to a deflection surface of said flow pass; and

capturing said portion of said particles using a particle capture unit formed in said deflection region of said flow pass.

25. A method according to Claim 24, further comprising the steps of:

forming, in said deflection region, a field for deflecting said portion of said particles away from said particle capture unit; and

causing said particles to flow through said flow pass,

wherein said particles can be segregated and released from said microchip.

26. A method according to Claim 24, wherein said particle capture unit protrudes into only a portion of a cross section of said flow pass.

27. A method according to Claim 24, wherein said particle capture unit comprises a projection protruding from said deflection region of said flow pass in said direction transverse to said direction of flow of said flow pass.

28. A method according to Claim 24, wherein said step of causing said particles to flow comprises the step of pumping said solution with a micropump.

29. A method according to Claim 24, wherein said step of causing said particles to flow comprises the step of applying a voltage across first and second propulsion electrodes disposed on opposing ends of said flow pass.

30. A method for separating particles from a solution containing said particles, the method comprising the steps of:

causing said particles to flow through a main flow pass of a microchip, said main flow pass being connected to a plurality of branch flow passes branching from said main flow pass; and

forming, proximate a branch of each of said plurality of branch flow passes, a field in a direction transverse to a direction of flow of said flow pass, said field deflecting a portion of said particles to a selected one of said plurality of said branch flow passes.

31. A method according to Claim 30, wherein said step of causing said particles to flow comprises the step of pumping said solution with a micropump.

32. A method according to Claim 30, wherein said step of causing said particles to flow comprises the step of applying a voltage across first and second propulsion electrodes disposed on opposing ends of said flow pass.

33. A method of manufacturing a microchip, comprising the steps of:

providing a wafer;

forming an oxidation layer on said wafer;

removing a portion of said oxidation layer corresponding to a flow pass;

removing a remaining portion of said oxidation layer corresponding to said flow

pass while retaining a portion of said oxidation layer corresponding to a plurality of projections;

etching said wafer to form a portion of said flow pass and said projections therein;

removing said portion of said oxidation layer corresponding to said plurality of projections;

further etching said wafer to form a remaining portion of said flow pass and said projections therein; and

providing a cover over said wafer.

34. An apparatus for use with a microchip containing a particle separation mechanism, said apparatus comprising:

a deflection control circuit for driving a deflection mechanism of said microchip; and

a control circuit for controlling operation of said deflection control circuit.

35. An apparatus according to Claim 34, wherein said deflection mechanism comprises an electrode, said deflection control circuit comprising a voltage circuit for applying a voltage to said electrode.

36. An apparatus according to Claim 34, wherein said microchip includes a micropump, said particle separation mechanism further comprising a micropump drive circuit for driving said micropump.

37. An apparatus according to Claim 34, further comprising:

a detector for detecting movement of selected particles in said microchip;

a light emitter for providing light for use with said detector;

wherein said deflection control circuit operates said deflection mechanism in accordance with said movement of said selected particles thus detected.